

APPENDIX 5.2.2.

DISINFECTION OF FISH FARMS

Article 5.2.2.1.

**General principles**

The choice of *disinfection* procedures depends on the size, type and nature of the materials and sites to be disinfected. With the exception of the skin of personnel and *eggs*, which must be disinfected with non-corrosive products, the surfaces to be disinfected consist of fabric or woven material (clothes, nets), hard surfaces (plastic, cement) or permeable materials (earth, gravel). *Disinfection* is more difficult for permeable surfaces and requires more time. Table 1 indicates the most common ingredients and the methods to be used on the basis of these criteria.

The use of chemical products entails the implementation of measures to protect personnel and the environment. It is first necessary to protect the skin and eyes from contact with dangerous substances by using impermeable clothing, boots, glasses and a hat. The respiratory tract must be protected by a mask and the operator must not touch any food without having thoroughly washed his/her hands. Finally, the products must be stored in such a way as not to present direct or indirect danger to animal/ *fish* or human life or the environment.

The material must be thoroughly cleaned before being disinfected. Organic material generated/removed during the cleaning process, such as pond sludge, etc., should also be disposed of in an appropriate manner that prevents spread of disease by such material and is environmentally safe.

Ideally, an approval scheme for [disinfection of products] disinfectants for use in aquaculture should be established. An approval scheme should consider disinfection effect against target pathogens, toxicological and ecotoxicological properties of the products.

Following disinfection or stamping-out, the farm should be restocked from a disease-free source.

**Disinfection**

See Table 1.

**Table 1.** *Disinfection and method of use*

Processes	Indications	Method of use *	Comments
<b>Physical</b>			
Desiccation, <u>sunlight</u>	Fish pathogens on earthen bottoms	Dry for 3 months at an average temperature of 18°C	Drying period can be reduced by the use of a chemical disinfectant
Dry heat	Fish pathogens on concrete, stone, iron, ceramic surfaces	Flame-blower, blow-lamp	
Damp heat	Fish pathogens in transportation vehicle tanks	Steam at 100°C or more for 5 minutes	
Processes	Indications	Method of use *	Comments
<b>Physical</b>			
Ultra-violet rays <u>UV-C (254 nm)</u>	Viruses and bacteria	10 mJ/cm <sup>2</sup>	Minimum lethal dose
[Ultra-violet rays	<i>Myxobolus cerebralis</i>	35 mJ/cm <sup>2</sup>	In order to inactivate all sporoplasm cells in the triactinomyxon stage a dose of 1300 mJ/cm <sup>2</sup> must be used]
Ultra-violet rays	Infectious pancreatic necrosis (IPN) and nodavirus (VNN/VER <sup>1</sup> ) in water	125 <sup>1</sup> 200 mJ/cm <sup>2</sup>	

<sup>1</sup> Viral nervous necrosis/Viral encephalopathy and retinopathy

**Table 1 (continued).** *Disinfection and method of use*

Process Chemical	Indications	Methods of use	Comments
Quaternary ammonia	Virus, bacteria, hands, <u>plastic surfaces</u>	[1 mg] <u>0.1–1 g</u> /litre for <u>1–15 minutes</u>	IPN virus resistant
[Quaternary ammonia]	Gill bacteria, plastic surfaces	2 mg/litre for 15 minutes]	
Calcium oxide <sup>a</sup>	Fish pathogens on dried earth-base	0.5 kg/m <sup>2</sup> for 4 weeks	Replace in water and empty disinfected pools keeping the effluents at pH <8.5
Calcium hypochlorite <sup>a</sup>	Bacteria and viruses on all clean surfaces and in water	30 mg available chlorine/litre left to inactivate for several days	Can be neutralised with sodium thiosulfate. See special recommendations
Calcium cyanamide <sup>a</sup>	Spores on earthen bottoms	3000 kg/ha on dry surfaces; leave in contact for 1 month	
Formalin	Fish pathogens in sealed premises	Released from formogenic substances, generally trioxymethylene. Comply with instructions	Nodavirus resistant
Iodine (iodophors)	Bacteria, viruses <u>on nets, boots and clothing</u>	<u>200 mg iodine/litre</u>	See special recommendations
Iodine (iodophors)	Hands, smooth surfaces	>200 mg iodine/litre a few seconds	
[Iodine (iodophors)]	Eyed eggs	100 mg iodine/litre for not more than 30 minutes	
Iodine (iodophors)	Gametes during fertilisation	25 mg iodine/litre for several hours	
Iodine (iodophors)	Nets, boots and clothing	200 mg iodine/litre]	

**Table 1 (continued).** Disinfection and method of use

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Processes	Indications	Method of use *	Comments
<b>Chemical</b>			
Ozone	Sterilisation of water, fish pathogens,	0.2–1 mg/litre for 3 minutes	Costly <u>and very toxic for fish and humans</u>
[Ozone in seawater	Egg disinfection	0.2–1 mg/litre TRO for 0.5–3 minutes]	
Ozone in seawater	Surfaces, equipment	0.5–1 mg/litre TRO <sup>2</sup> for 30–60 minutes	
Sodium hydroxide <sup>a</sup>	Fish pathogens on resistant surfaces with cracks	Mixture: Sodium hydroxide, 100 g Teepol®, 10 g Calcium hydroxide, 500 g Water, 10 litres Spray, 1 litre/10 m <sup>2</sup> Leave for 48 hours	The most active disinfectant Ca(OH) <sub>2</sub> stains the surfaces treated; Teepol® is a tensio-active agent. Turn water on, checking pH
Sodium hypochlorite <sup>a</sup>	Bacteria and viruses on all clean surfaces and in water	30 mg available chlorine/litre. Leave to inactivate for a few days or neutralise with Na thiosulfate after 3 hours	
Sodium hypochlorite <sup>a</sup>	Nets, boots and clothing	200 mg <u>to 1 g</u> available chlorine/litre for several minutes	
Sodium hypochlorite <sup>a</sup>	Hands	Rinse with clean water or neutralise with thiosulfate	

a Dangerous <sup>1</sup> See precautions indicated in general recommendations

\* The concentrations indicated are those for the active substance. NB: The chemicals must be approved for the prescribed use and used according to the manufacturer's specifications.

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<sup>2</sup> Total residual oxidant

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